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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

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TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

PLASTERER (const.) 5-29.100

B-517 or S-240

TI 001 751

U. S. Employment Service
in Cooperation with
California State Employment Service

March 1963

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GATB # 2403

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

PLASTERER (const.) 5-29.100

B-517

Summary

The General Aptitude Test Battery, B-1002A, was administered to a final sample of 66 men indentured in the apprenticeship program for Plasterer 5-29.100 at Long Beach City College, Los Angeles Trade-Technical College, Palomar Junior College, San Diego City College, and Ventura College. The criterion consisted of instructor's ratings. On the basis of mean scores, standard deviations, correlations with the criterion, job analysis data, and their combined selective efficiency, Aptitudes - N-Numerical Aptitude, P-Form Perception, and M-Manual Dexterity were selected for inclusion in the final test norms.

GATB Norms for Plasterer 5-29.100, B-517

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
N	CB-1-D CB-1-I	85	N	Part 2 Part 6	80
P	CB-1-A CB-1-L	85	P	Part 5 Part 7	85
M	CB-1-M CB-1-N	105	M	Part 9 Part10	100

Effectiveness of Norms

The data in Table IV indicate that 17 of the 22 poor workers, or 77 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 77 percent of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 33 of the 38 workers who made qualifying test scores, or 87 percent, were good workers.

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I. Purpose

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Plasterer 5-29.100.

I. Sample

During the period June 6 through November 16, 1961, the General Aptitude Test Battery, B-1002A, was administered to 77 apprentice plasterers enrolled in the apprenticeship program at Long Beach City College, Los Angeles Trade-Technical College, Palomar Junior College, San Diego City College, and Ventura College. The arrangements for obtaining this sample were made in cooperation with the Joint Apprenticeship Committees in the Southern California area.

The final experimental sample consisted of 66 male apprentices. Six apprentices were eliminated from the sample because adequate ratings could not be obtained. Two were eliminated because they dropped out of the apprenticeship to enter the Armed Services. One was eliminated because he had less than 6th grade education. Two were eliminated because of less than 18 months in the apprenticeship program. It was agreed by the Joint Apprenticeship Committee and instructors that 18 months experience was a reasonable length of time to determine whether an apprentice Plasterer would succeed in the program.

Admittance to the apprenticeship program is restricted to an individual between the ages of 17 and 25, except in the case of persons with previous experience in the trade or unusual educational training which would be applicable; individuals who are primarily engaged in learning and assisting in the trade of plastering; to those entering into a written agreement with the Joint Apprenticeship Committee. No minimum educational requirement is stipulated. The educational qualifications of each applicant are evaluated on an individual basis by the Joint Apprenticeship Committee. The term of apprenticeship training consists of 4 calendar years; 6400 hours of work and related instruction is the minimum requirement. Apprentices attend an approved trade school not less than 144 hours per year for the entire term of apprenticeship, preferably on the basis of 4 hours per week for 36 weeks each year.

TABLE I

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

N = 66	M	σ	Range	r
Age (years)	22.7	2.7	17-31	.152
Education (years)	11.1	1.3	7-14	.207
Experience (months)	31.6	8.2	18-48	.219

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III. Job Description

Job Title: Plasterer (const.) 5-29.100

Job Summary: Applies plaster over masonry and lath of walls and ceilings or irregular surfaces using trowel and other hand tools.

Work Performed: Applies preliminary coats of plaster; spreads or adds required amount of scratch-coat plaster on surfaces to obtain desired thickness. Scratches grooves into surfaces with wire brush to facilitate bonding with second coat.

Applies finish coats of plaster. Scrapes high spots on surfaces with scraper or applies casting mix to fill in low spots, using trowel to secure allignment, in accordance with guides. Applies smooth finish coat of white plaster to surfaces using trowel, and allows plaster to set. Applies second coat of finish plaster to obtain desired thickness, using trowel. Pulls straightedge across face of surface and featheredge along corners to remove excess plaster and level them.

Molds and installs plaster panels. Shapes freshly mixed plaster with template. Applies coat of plaster to wall and presses casting into position.

Coats (runs) plaster cornices by applying plaster coat to wall or ceiling and pushing template over plaster until desired shape and smoothness is attained.

Course Summary: Consists of thorough technical instruction to afford apprentices a knowledge of the craft which will develop the fundamental akills required to assist them in becoming qualified journeymen. Courses are carefully planned for the four year training period and standards require a minimum of 144 school hours annually. Below is an outline of the courses for apprentices:

First Year: Instruction covers health and safety; history and development of the plastering trade; chemistry of plastering materials; proportions of mixture; lath and masonry bases; apprentice requirements in relation to apprentice committee and the plastering industry.

Second Year: Instruction covers basic mathematics of the plastering trade; blueprint reading; job conditions affecting plastering; plaster cracks and their causes; dotting, pressed screeds, and water leveling; job layout problems.

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Third Year: Instruction covers advanced blueprint reading and mathematics and some job estimating; acoustical plastering; effect of poor construction on plastering; running mold construction and application; mitering, breaks and returns; geometrical layout problems; molding and casting.

Fourth Year: Instruction covers advanced study of all phases of plastering; employee-employer relations; laws and ordinances affecting the plastering trade; industrial relations affecting all phases of employee relations with other branches of the building industry.

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IV. Experimental Battery

All the tests of the GATB, B-1002A, were administered to the sample group.

V. Criterion

The criterion consisted of two sets of instructor's ratings of classroom performance made on an adaptation of the Descriptive Rating Scale developed by the United States Employment Service. Second ratings were obtained for each apprentice after a period of at least two weeks. The rating scale consisted of nine items with five alternatives for each item. The alternatives indicated the degree of performance attained. Weights of one through five were assigned to each alternative so that the minimum possible score was nine and the maximum forty-five. The coefficient of reliability between the two ratings was .891 indicating a significant relationship. The final criterion score consisted of the combined scores of the two sets of instructor ratings. The distribution of the combined scores ranged from 23 to 87, with a mean score of 55.3 and a standard deviation of 13.7.

VI. Qualitative and Quantitative Analyses

A. Qualitative Analysis:

The job analysis indicated that the following aptitudes measured by the GATB appear to be important for this occupation:

Spatial Perception (S) --required to perform work in accordance with blueprint specifications; to visualize shapes and contours of plaster in relation to structures.

Form Perception (P) - required to align dots and screeds on walls and ceilings according to specified thickness; to determine, establish, and check that plaster is applied smoothly, evenly and to the desired thickness.

Finger Dexterity (F) and Manual Dexterity (M) - required to work accurately with hands; scoops, applies, spreads, scratches, and smooths plaster on surfaces in forward, backward, and circular motion using hand tools.

On the basis of the job analysis data, Aptitude V-Verbal Aptitude was rated "irrelevant" for successfully performing the duties of this job.

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B. Quantitative Analysis:

TABLE II

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB; N = 66

Aptitudes	M	σ	r
G-Intelligence	93.3	14.9	.531**
V-Verbal Aptitude	89.0	13.4	.349**
N-Numerical Aptitude	90.1	16.6	.425**
S-Spatial Aptitude	103.3	18.4	.407**
P-Form Perception	100.0	13.1	.279*
Q-Clerical Perception	95.4	10.5	.263*
K-Motor Coordination	100.2	16.8	.094
F-Finger Dexterity	98.2	17.8	.212
M-Manual Dexterity	109.9	19.7	.219

**Significant at the .01 level
*Significant at the .05 level

C. Selection of Test Norms:

TABLE III

Summary of Qualitative and Quantitative Data

Evidence	Aptitudes G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important				X	X			X	X
Irrelevant		X							
Relatively High Mean				X	X		X		X
Relatively Low Sigma	X	X			X	X			
Significant Correlation with Criterion	X	X	X	X	X	X			
To be Considered for Trial Norms	G		N	S	P	Q			M

Trial norms consisting of various combinations of Aptitudes G, N, S, P, Q & M with appropriate cutting scores were evaluated against the criterion by means of the Phi Coefficient technique. A comparison of the results showed that B-1002 norms consisting of N-80, P-85 and M-100 had the best selective efficiency.

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VII. Validity of Norms (Concurrent)

The validity of the norms was determined by computing a Phi Coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing 33 percent of the sample in the low criterion group because this percent was considered to be the unsatisfactory or marginal workers.

Table IV shows the relationship between test norms consisting of Aptitudes N, P and M with critical scores of 80, 85 and 100, respectively, and the dichotomized criterion for Plasterer 5-29.100
Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE IV

Validity of Test Norms for Plasterer 5-29.100
(N-80, P-85, M-100)

N = 66	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	11	33	44
Poor Workers	17	5	22
Total	28	38	66

Phi Coefficient = .50
χ^2 = 16.434
P/2 < .0005

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes N, P and M with minimum scores of 80, 85 and 100, respectively, have been established as B-1002 norms for Plasterer 5-29.100.
The equivalent B-1001 norms consist of N-85, P-85 and M-105.

IX. Determination of Occupational Aptitude Pattern

The specific norms established for this study did not meet the requirements for incorporation into any of the existing 35 OAP's (revised 10/61). The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.